Using the State Revolving Funds to Build Climate-Resilient Communities

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Introduction

The Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF) have enabled states to provide more than $109 billion dollars in low-interest loans and grants to communities to better protect public health and improve the quality of our nation's water resources.[1] These funds were identified by President Obama in his Climate Action Plan as a key tool for helping prepare the nation for the impacts of climate change.[2] Both state revolving funds can be utilized for a range of preparedness activities that can help address issues such as local flooding, water scarcity, and infrastructure resiliency. However, these funds have historically been underutilized for these purposes. In this issue paper, we offer recommendations on how incorporating water efficiency, green infrastructure, and flood risk reduction policies into the SRFs can help build climate-resilient communities.

Record numbers of extreme weather events including floods, heat waves, droughts, fires and snowstorms have affected communities across the U.S. in recent years. These disasters underscore the need for communities to plan and prepare for existing needs as well as those looming in the future. Many extreme weather events as well as warmer temperatures, changing precipitation patterns, and rising sea levels are expected to intensify as climate change continues. These climate impacts threaten public health, affect water availability and quality, and put homes and infrastructure at risk. To effectively prepare, communities must proactively consider climate change-related risks and implement flexible and sustainable solutions to protect public health, the economy, and the environment.

There are several existing funding programs that involve federal, state, and local partnerships that can be used to make communities more resilient to the impacts from a changing climate. The State Revolving Funds (SRFs) are clear examples. They provide critical funding to a wide range of communities—from the nation's largest cities to small, rural towns—for a variety of water and wastewater projects, including drinking water and wastewater treatment facilities and systems to manage stormwater pollution. The SRFs also help support local economies, with every dollar invested in water infrastructure generating roughly $2.62 in the private economy, and every new job added in the water sector adding 3.68 jobs to the national economy.[3]

These programs provide much-needed funds to communities to meet existing water infrastructure needs and increasingly, to address challenges from natural disasters like floods and droughts and climate change impacts. As was witnessed during Hurricane Sandy, power outages and flooding interrupted water and sewer service to tens of millions

of people and caused the release of billions of gallons of untreated sewage across the Northeast.[4] The SRF funds are necessary not only to repair water and wastewater infrastructure but also to make our communities more resilient to future storms and other extreme weather events.

Yet, the SRFs are more than just a funding source for water infrastructure projects—they also can be used to purchase, refinance, or guarantee public debt obligations. In fact, several states have utilized innovative financing models to expand the amount of funding available to communities through the SRFs.[5]

However, reductions in federal funding levels for the SRFs in recent years have resulted in decreases in state capitalization grant allocations, jeopardizing the number of projects that states can fund. Although the SRFs provide billions of dollars in funding, our nation's water infrastructure needs far exceed the amount of funding available. Over the next 20 years, water infrastructure needs in communities across the U.S. total more than $630 billion simply to maintain current levels of service.[6] Drinking water and wastewater utilities will need an additional $448 billion to $944 billion to prepare for climate change-related impacts through 2050.[7]

Ongoing federal support is needed to both maintain and strengthen our nation's water infrastructure. However, state and local partners also will need to consider how using infrastructure funding in smarter and more sustainable ways can help communities prepare for climate change risks. For example, incorporating water efficiency, green infrastructure, and flood risk reduction policies into the SRFs can help build climate-resilient communities.

Water conservation and efficiency measures are cost-effective ways to address water scarcity risks by lowering water demand, improving the reliability of existing supplies, delaying capital expenditures for new water infrastructure, and reducing energy demands associated with the treatment and delivery of water and wastewater. Green infrastructure practices, such as green roofs, permeable pavements, and rain barrels, reduce polluted runoff, localized flooding, and sewer overflows. They also literally green the urban landscape, cool and cleanse the air, enhance water supplies, reduce asthma and heat-related illnesses, cut heating and cooling energy costs, and enhance property values. Considering existing and future flood risks when we make decisions about where we locate and how we design critical water infrastructure projects reduces the likelihood that future storms and other disasters cause costly damage that imperils the public health and safety of our communities.

Together, these solutions will not only help communities meet their water infrastructure needs now but also better equip them to handle storms, floods, droughts, and other extreme weather events in the years ahead.

[1] U.S. Environmental Protection Agency (EPA), "Clean Water State Revolving Fund," *available at* http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm and "Drinking Water State Revolving Fund (DWSRF)," *available at* http://water.epa.gov/grants_funding/dwsrf/index.cfm.

[2] Executive Office of the President, "President's Climate Action Plan" (2013), 12-13, *available at* http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.

[3] American Water Works Association, "Infrastructure Financing," *available at* http://www.awwa.org/legislation-regulation/issues/infrastructure-financing.aspx.

[4] Climate Central, "Hurricane Sandy's Untold Filthy Legacy: Sewage," *available at* http://www.climatecentral.org/news/11-billion-gallons-of-sewage-overflow-from-hurricane-sandy-15924.

[5] Environmental Financial Advisory Board, *SRF Investment Function: Current Status and Prospects for Enhancing SRF Sustainability* (2011), *available at* http://nepis.epa.gov/Adobe/PDF/P100DPVL.PDF.

[6] American Society of Civil Engineers (ASCE), "2013 Report Card for America's Infrastructure," *available at* http://www.infrastructurereportcard.org/a/#e/drinking-water-wastewater-infographic-01.

[7] National Association of Clean Water Agencies (NACWA) and Association of Metropolitan Water Agencies (AMWA), *Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs* (2009), *available at* http://www.amwa.net/galleries/climate-change/ConfrontingClimateChangeOct09.pdf.

Integrating Water Efficiency into the SRFs

Record-breaking drought conditions in recent years have caused water shortages in afflicted communities, widespread devastation to local and regional economies, and even shut down commerce on parts of the busiest waterway in the U.S.[1] As temperatures continue to rise and precipitation patterns change, many parts of the U.S. will increasingly face challenges in maintaining adequate water supplies all while water demands increase.[2]

Water conservation and efficiency are effective means of increasing resilience to climate impacts such as increased drought, decreased precipitation, and declining snowpack. These measures also lower water demand, improve the reliability of existing water supplies, delay capital expenditures for new water infrastructure, and reduce energy demands associated with the treatment and delivery of water and wastewater. Water-efficient landscapes, water-conserving plumbing fixtures, water rate mechanisms, and the detection and repair of leaks in water distribution systems are a few examples of ways to reduce urban water demand.[3]

We recommend four complementary approaches for integrating water efficiency into the DWSRF and CWSRF programs.[4] As explained below, there is ample legal authority for EPA and/or the states to implement these policies; a number of states are already using these approaches or similar ones; and there are many examples of water and wastewater utilities that have successfully used (or are currently using) water conservation strategies to reduce water demand and the costs of water and wastewater infrastructure.

The four recommended approaches are:

1. **Promote the availability of DWSRF and CWSRF funds for water conservation projects and programs.**

   Such activities have long been eligible for funding under the SRF programs, but have likely been under-utilized. Similar to how the Green Project Reserve under the CWSRF has successfully promoted the uptake of green infrastructure practices, states could engage in proactive outreach to encourage SRF funding applications for water conservation projects.

2. **Require water and wastewater utilities to adopt comprehensive water conservation plans and/or specific policies or programs, as a condition of eligibility for funding.**

U.S. EPA and others have already developed guidance for utilities on the development of water conservation plans. Note that, although some water conservation strategies are relevant only to drinking water utilities (*e.g.*, water loss audits and leak repair), most are equally applicable to wastewater utilities (*e.g.*, direct replacement of inefficient plumbing fixtures and fittings in existing homes and other buildings; consumer incentives/rebates for water efficient fixtures and appliances; metering, volumetric billing, and conservation pricing; and changes in local ordinances, building codes, or plumbing codes requiring installation of water efficient fixtures and appliances).

3. **Require that water, wastewater, and stormwater projects seeking funding must (i) evaluate water conservation alternatives, (ii) include in the project any such measures that reduce the net capital/operating costs of the project, and (iii) incorporate the resulting flow reductions into the design of the overall project.**

   The Title II Construction Grants Program, which predated the CWSRF, required project applicants to evaluate and implement cost-effective "flow reduction" methods, to reduce water demand and ensure efficient use of wastewater infrastructure funding.[5] A similar approach would be sound policy today.

4. **Ensure that designs of new, replacement, or expanded infrastructure are based on the most current data and projections of per capita water demand, which are already on a downward trend nationally.**

   While targeted local water conservation programs can rapidly accelerate water use reductions, there is already a downward trend in per capita/household water use, due in large part to national plumbing fixture efficiency standards.[6] New national standards that are being phased-in over the next several years (*e.g.*, for washing machines) will accelerate this downward trend. EPA should ensure that state SRF programs are aware of these trends and do not rely on outdated assumptions of domestic water use when reviewing and approving funding applications.

A. Legal authority for EPA and States to promote water efficiency under the SRFs

Existing EPA policy makes clear that water conservation projects and programs are eligible for funding under both the DWSRF[7] and CWSRF.[8] Moreover, EPA and states have the

authority to require and/or promote water efficiency measures as a condition of SRF funding for all projects.

DWSRF

- EPA authority:

    - EPA has an explicit statutory obligation to ensure that DWSRF funds are used "efficiently." EPA is authorized to achieve this goal both through requirements established by EPA regulations[9] and through conditions that must be included in capitalization grant agreements.[10] Because the costs of building, operating, and maintaining drinking water infrastructure are directly related to the volume of water that must be supplied, measures that promote efficient water use are essential to ensuring the efficient use of DWSRF resources.[11]

    - In 1988, EPA was expressly required to publish guidelines for water conservation plans for public water systems, to use in conjunction with the DWSRF program.[12] EPA has the inherent authority to update this guidance to reflect best practices that have evolved over the last 16 years.

    - EPA regulations require environmental review to be conducted for DWSRF-funded projects, equivalent to the review required under NEPA. This includes "comparative evaluation of alternatives" to the proposed project, which must consider "the beneficial and adverse consequences on the existing environment, the future environment, and individual sensitive environmental issues that are identified," and must identify "measures to avoid, minimize, or mitigate adverse impacts."[13] Through enforcement of this provision, EPA can ensure that states and utilities seeking DWSRF funds evaluate water conservation strategies as "alternatives" that would allow reductions in water withdrawals and downsizing of proposed infrastructure projects, thereby reducing adverse impacts on source waters and any direct adverse impacts from the construction and operation of drinking water facilities.

- State authority:

    - The Safe Drinking Water Act authorizes states to condition a project's DWSRF funding eligibility on the "submi[ssion of] … a water conservation

plan consistent with" EPA's guidelines for water conservation plans for public water systems.[14]

- More broadly, states retain complete discretion to place additional conditions on eligibility for DWSRF funding, so long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.[15] The states establish their "criteria and methods…for the distribution of funds" through the development of annual Intended Use Plans (IUPs).[16]

CWSRF

- EPA authority: Although the CWSRF authorizing statute[17] does not expressly require EPA to ensure that CWSRF funds are used "efficiently," such a responsibility can be implied by the statute's general purposes and its assignment of responsibility to EPA to administer the program. Since the costs of building, operating, and maintaining wastewater infrastructure are directly related to the volume of wastewater that must be treated – and the volume of wastewater is a function of the volume of potable water used – measures that promote efficient water use are essential to ensuring the efficient use of CWSRF resources.[18]

- State authority: States retain complete discretion to place additional conditions on eligibility for CWSRF funding, so long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.[19] The states establish their "criteria and method[s]…for the distribution of funds" through the development of annual Intended Use Plans (IUPs).[20]

B. Examples of State SRF programs that condition funding eligibility on water conservation practices

Although it appears that no state has taken advantage of the opportunity to condition funding eligibility for DWSRF projects on the submission of a water conservation plan consistent with" EPA's Water Conservation Plan Guidelines,"[21] a number of states condition DWSRF and/or CWSRF funding eligibility on either (i) the evaluation of water conservation alternatives that would reduce or eliminate the need for the proposed project, or (ii) a utility's implementation of certain water conservation practices. Examples are listed below:

DWSRF examples

- California:

    - Effective July 2016, eligibility for DWSRF funds will be contingent on compliance with the state's per capita water use reduction targets for urban water suppliers (10% reduction by 2015 and 20% reduction by 2020).[22]

    - "Urban water suppliers," as a condition of eligibility for financial assistance from the state for a water use efficiency project, a drinking water treatment project, or a permit for a new or expanded water supply, must meet specific requirements concerning metering and volumetric billing.[23] The funding condition applies to DWSRF, as well as to CWSRF <u>if</u> it is an integrated utility that does both drinking water and wastewater.

- Colorado: Water utilities applying for funds must have an updated water conservation plan, as a condition of eligibility.[24]

- Kansas: To be eligible for funding, utilities must have "adopted and implemented conservation plans and practices that are consistent with" state guidelines.[25]

- Nebraska: Under the state's 2012 DWSRF IUP, if the water system applying for funds does not have service connections individually metered, then water meters will be required as part of the project.[26]

- Utah: "The applicant must have adopted a Water Conservation Plan prior to executing the loan agreement."[27]

<u>CWSRF examples</u>

- California: Utilities that function as integrated water and wastewater utilities must, as a condition of eligibility for financial assistance from the state for a wastewater treatment project or a water use efficiency project, must meet specific requirements concerning metering and volumetric billing.[28]

- Nebraska: Applications must include a cost-effectiveness analysis, including "evaluation of alternative flow reduction methods."[29]

- New Jersey: Applications must include evaluation of flow reduction methods.[30]

C. Examples of water and wastewater utilities using water conservation strategies to reduce water demand and the costs of water and wastewater infrastructure

It is well-known that drinking water utilities can and do implement water conservation programs as a means of reducing demand and, thereby, avoiding or minimizing the need to develop new water sources, expand withdrawals for existing water sources, or construct new water delivery and treatment infrastructure.[31]

Less well-known is that many wastewater utilities and communities, both large and small, have undertaken, or are currently implementing, water conservation strategies as a means of avoiding or minimizing the need for expanded wastewater treatment capacity. These include: Boston, MA;[32] Cotati, CA;[33] East Bay Municipal Utility District, CA;[34] Goleta, CA;[35] New York;[36] San Jose, CA;[37] Orleans, MA;[38] Olympia, WA;[39] Spokane, WA;[40] San Antonio;[41] San Francisco;[42] Santa Monica, CA;[43] and Washington, DC.[44] Leading industry associations also have endorsed the vision that a wastewater "utility of the future" will engage pro-actively in water conservation efforts "to reduce sanitary wastewater and expansion of wastewater infrastructure."[45] Nonetheless, at present, demand-side management and planning is not nearly as common among wastewater utilities as it is among drinking water utilities; the CWSRF program, therefore, has the potential to significantly increase the use of these approaches.

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[1] *See e.g.,* Peter Whoriskey and Michael A. Fletcher, "Drought in U.S. reaching levels not seen in 50 years, pushing up crop prices," July 16, 2012, *Washington Post*; *available at* http://www.washingtonpost.com/business/economy/drought-in-us-reaching-levels-not-seen-in-50-years-pushing-up-corn-prices/2012/07/16/gJQA01SopW_story.html; Chris Lusvardi, "Decatur enacts mandatory water restrictions," July 24, 2012, *Herald Review*, *available at* http://herald-review.com/news/local/decatur-enacts-mandatory-water-restrictions/article_75724a1a-d53c-11e1-b46a-0019bb2963f4.html; and CNN, "Drought sends 'mighty Mississippi' river levels near record lows," July 19, 2012, *available at* http://news.blogs.cnn.com/2012/07/19/drought-sends-mighty-mississippi-river-levels-near-record-lows/.

[2] U.S. Environmental Protection Agency (EPA), "Climate Impacts on Water Resources," *available at* http://www.epa.gov/climatechange/impacts-adaptation/water.html.

[3] NRDC and American Rivers, "Top 10 No-Regret Strategies," *Getting Climate Smart*: *A Water Preparedness Guide for State Action* (2013), 48-55, *available at* http://www.nrdc.org/water/climate-smart.

[4] The discussion below references many EPA SRF guidance documents, memoranda, and fact sheets that recommend the use of water efficiency strategies under both the DWSRF and CWSRF. In addition, EPA's WaterSense program has promoted water efficiency practices in connection with both the DWSRF and CWSRF programs, (*see* http://www.cifanet.org/documents/09WS/Blette.pdf); and EPA's recent "sustainability" guide for the CWSRF also promotes water efficiency practices (*see Sustainability and the CWSRF: A Best Practices Guide*, EPA-832-R-12-005, p. 9 (July 2012), http://water.epa.gov/grants_funding/cwsrf/upload/CWSRF-Best-Practices-Guide.pdf).

[5] Those regulations—which were intended to ensure the cost-effectiveness of grant-funded projects—required evaluation of "flow reduction" (i.e., water conservation) methods to reduce demand for treatment plant capacity, the adoption of such measures where cost-effective, and adjusting the sizing of projects to account for the

reduced flow. *See* U.S. EPA, *Flow Reduction: Methods, Analysis Procedures, Examples* (1981) for flow reduction evaluation guidance and 40 CFR Part 35, Subpart E, Appendix A, ¶ 8(c) for guidance on project sizing.

[6] *Rockaway*, et al. 2011. *"Residential water use trends in North America." Journal AWWA*. Vol. 103, Issue 2.

[7] U.S. EPA Office of Water, Memo No. DWSRF 03-03 (July 25, 2003), *available at* http://www.epa.gov/ogwdw/dwsrf/pdfs/memo_dwsrf_policy_2003-07-25.pdf); *see also* U.S. EPA 816-F-03-022 (Aug. 2003), *available at* http://www.epa.gov/ogwdw/dwsrf/pdfs/fact_dwsrf_water_efficiency03-09-02.pdf. Additionally, "[a]t a state's option, water conservation plan preparation is eligible for SRF funding." U.S. EPA *Water Conservation Plan Guidelines*, p. 7, *available at* http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=200043OS.txt.

[8] U.S. EPA Office of Water, Memo No. CWSRF 00-13 (Sept. 20, 2000), available at www.cuwcc.org/WorkArea/downloadasset.aspx?id=4324*; see also* U.S. EPA 832-F-99-050 (June 1999), *available at* http://water.epa.gov/grants_funding/cwsrf/upload/2002_06_28_cwfinance_cwsrf_cwreuse.pdf.

[9] 42 U.S.C. § 300j-12(g)(3) (authorizing EPA to publish guidelines and promulgate regulations "…as may be necessary to carry out the [DWSRF program], including—(A) provisions to ensure that each State commits and expends funds allotted to the State under this section as efficiently as possible…"); *see also* 40 C.F.R. § 35.3500 (providing that "the purpose of this subpart is to ensure that each State's [DWSRF] program is designed and operated in such a manner as to…promote the efficient use of all funds…").

[10] 42 U.S.C. § 300j-12(a)(1)(A) (providing that EPA shall enter into agreements with states which, among other things, must, "promote the efficient use of fund resources"); *see also* 40 C.F.R. § 35.3550(l) (requiring that, in capitalization grant agreements, "[a] State must agree to commit and expend all funds as efficiently as possible…").

[11] EPA's Water Conservation Plan Guidelines under the DWSRF state: "Properly planned and implemented, water conservation programs can defer, reduce, or eliminate the need for not only water supply facilities but wastewater facilities, as well. Significant capital cost savings can result, which in turn translates to smaller loan amounts for SRF Programs. This frees up money in limited loan funds to finance more projects to help achieve a state's compliance and public health goals." http://www.epa.gov/WaterSense/docs/part1_508.pdf. Similarly, an EPA DWSRF fact sheet states: "Water efficiency and reuse programs help systems avoid, downsize, and postpone expensive infrastructure projects, such as developing new source water supplies, building new treatment capacity, and expanding pumping and delivery infrastructure. When unneeded investments are avoided, systems have more resources for other critical needs." U.S. EPA 816-F-03-022 (Aug. 2003) (http://www.epa.gov/ogwdw/dwsrf/pdfs/fact_dwsrf_water_efficiency03-09-02.pdf).

[12] 42 U.S.C. § 300j-15(a). *See* U.S. EPA, *Water Conservation Plan Guidelines*, *available at* http://www.epa.gov/WaterSense/docs/part1_508.pdf.

[13] 40 C.F.R. § 35.3580.

[14] 42 U.S.C. § 300j-15(a).

[15] *See* 42 U.S.C. § 300j-12(f) ("Except *as otherwise limited by state law*, the amounts deposited into a State loan fund under this section may be used…" (emphasis added)).

[16] 42 U.S.C. § 300j-12(b)(2).

[17] 33 U.S.C.A. §§ 1381-87.

[18] EPA guidance states: "Properly planned and implemented, water conservation programs can defer, reduce, or eliminate the need for not only water supply facilities but wastewater facilities, as well. Significant capital cost savings can result, which in turn translates to smaller loan amounts for SRF Programs. This frees up money in limited loan funds to finance more projects to help achieve a state's compliance and public health goals." http://www.epa.gov/WaterSense/docs/part1_508.pdf. Similarly, a 1999 EPA CWSRF fact sheet states: ""Because facilities that collect and treat wastewater are sized to meet flow projections, when flows are inflated by wasteful water use, it costs more than necessary in capital and operating costs to assure safe and efficient services. Water conservation and reuse Programs can be developed to help systems avoid, downsize, or postpone wastewater projects. There are also benefits from increased treatment plant efficiency and reduced energy costs." http://water.epa.gov/grants_funding/cwsrf/upload/2002_06_28_cwfinance_cwsrf_cwreuse.pdf.

[19] *See* 33 U.S.C.A. § 1383 ("Except *as otherwise limited by State law*, a water pollution control revolving fund of a state under this section may be used. . ." (emphasis added)).

[20] 33 U.S.C.A. § 1386.

[21] *See* 42 U.S.C. § 300j-15(a).

[22] Ca. Water Code § 10608.56 (http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=10608.56). This provision is applicable to the DWSRF because it applies to all grants and loans by "the state" to "urban retail water suppliers"

[23] Ca. Water Code, § 529.5; *id*. §§ 525 – 528.

[24] CRS 37-60-126.

[25] Kan. Stat. Ann. § 65-163g(b)(1). *See also* Kansas Municipal Water Conservation Plan Guidelines (2007) (http://www.kwo.org/projects_programs/WaterConservationEducation/rpt_2007%20WCP_Guidelines_081507_ms%20.pdf).

[26] 2012 IUP at 46. (http://www.deq.state.ne.us/Publica.nsf/2fb83fae0322b61606256ad900655c9c/56d575b7214db282862578db004fb052/$FILE/2012-IUP-FINAL.pdf).

[27] Utah Admin. Code R309-700-4(24).

[28] Ca. Water Code, § 529.5; *id*. §§ 525 – 528. With respect to the CWSRF, it appears that only integrated water and wastewater utilities – but not stand-alone wastewater utilities – are bound by this requirement, since it applies only to "urban water suppliers."

[29] Neb. Admin. R. & Regs. Tit. 131, Ch. 4, § 004.

[30] N.J.A.C. 7:22-3.11.

[31] A recent survey of 328 drinking water utilities nationwide found that nearly one-quarter of them have water conservation programs. Black & Veatch. 2013. "2013 Strategic Directions in the U.S. Water Industry." Retrieved 6/12/13 at http://bv.com/docs/reports-studies/2013-water-report-web.pdf.

[32] http://www.mwra.state.ma.us/comsupport/pilotprograms/0509depfinalreport.pdf

[33] http://www.codepublishing.com/CA/Cotati/html/Cotati13/Cotati1364.html

[34] http://www.allianceforwaterefficiency.org/water-efficiency-watch-april-2010.aspx?terms=wastewater#c_bennett

[35] http://www.epa.gov/WaterSense/docs/utilityconservation_508.pdf

[36] http://www.gao.gov/new.items/rc00232.pdf (p. 21).

[37] http://nepis.epa.gov/Exe/ZyNET.exe/20004MQA.txt?ZyActionD=ZyDocument&Client=EPA&Index=1995%20Thru%201999&Docs=&Query=%28wastewater%29%20OR%20FNAME%3D%2220004MQA.txt%22%20AND%20FNAME%3D%2220004MQA.txt%22&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5CTXT%5C00000002%5C20004MQA.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=54

[38] http://town.orleans.ma.us/Pages/OrleansMA_BComm/cwmpfinal (sec. 11.5.3).

[39] http://www.lottcleanwater.org/conservation.htm; http://www.spokanecounty.org/utilities/rptdoc/2008jan/02-04%20Water%20Conservation.pdf (p. 4-3).

[40] http://www.spokanecounty.org/utilities/RptDoc/fwwfp/FFP%2009%20Recommended%20Plan.pdf

[41] http://www.pbs.org/newshour/bb/science/jan-june13/sewers_01-03.html; http://www.cifanet.org/documents/09WS/Blette.pdf

[42] http://www.allianceforwaterefficiency.org/awe-sfpuc-op-ed.aspx

[43] http://www.epa.gov/WaterSense/docs/utilityconservation_508.pdf

[44] http://nepis.epa.gov/Exe/ZyNET.exe/20004MQA.txt?ZyActionD=ZyDocument&Client=EPA&Index=1995%20Thru%201999&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\ZYFILES\INDEX%20DATA\95THRU99\TXT\00000002\20004MQA.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=56

[45] WERF, WEF, & NACWA. 2013. "The Water Resources Utility of the Future: A Blueprint for Action." Retrieved 6/12/13 at http://www.nacwa.org/images/stories/public/2013-01-31waterresourcesutilityofthefuture-final.pdf.

Integrating Green Infrastructure into the SRFs

Since 1950, heavy rainfall events in every region of the U.S. have become more intense.[1] Rising temperatures from climate change are expected to further increase the intensity and frequency of these events in many regions of the country.[2] More extreme rainfall events are likely to increase flooding risks to property and overwhelm infrastructure such as wastewater treatment plants, which could lead to discharges of untreated sewage, exposing people to pathogens and increasing infectious disease risks.[3]

Green infrastructure techniques can be utilized to reduce the flooding risks associated with more frequent and intense rainfall events. These techniques use soils and vegetation in the built environment to absorb runoff close to where it falls, limiting flooding and sewer backups. Green infrastructure such as green roofs, rain gardens, roadside plantings, porous pavement, and rainwater harvesting not only reduce flooding and protect water quality – they also transform rainwater from a source of pollution into a valuable resource that helps to literally green the urban landscape, cool and cleanse the air, enhance water supplies, reduce asthma and heat-related illnesses, cut heating and cooling energy costs, create urban oases of open space, and enhance property values.[4]

We recommend four complementary approaches for integrating green infrastructure into the CWSRF and DWSRF programs. As explained below, there is ample legal authority for the states to implement these policies; a number of states are already using these approaches or similar ones; and there are many examples of water and wastewater utilities that have successfully used (or are currently using) green infrastructure to improve water quality while simultaneously creating a host of co-benefits.

The four recommended approaches are:

1. **Assign a higher priority to green infrastructure projects on the Project Priority List through modification of state scoring criteria.**

   States can prioritize green infrastructure projects and programs by ensuring that the formula used to score and rank project applications provides "bonus points" for the use of green infrastructure.

2. **Require CWSRF projects intended to reduce sewer overflows or improve stormwater management to evaluate and implement all green infrastructure measures found to be cost-effective.**

As part of this requirement, project applicants should: (i) evaluate the costs, cost savings, and effects of green infrastructure measures that reduce the amount of stormwater entering combined or separate sewer systems; (ii) include all green infrastructure measures found to be cost-effective; and (iii) take into account in the design of the project the reductions in the amount of stormwater entering combined or separate sewer systems achievable through such a green infrastructure program.

3. **Promote the availability of CWSRF and DWSRF funds for green infrastructure projects and programs.**

   Such activities have long been eligible for funding under the SRF programs, but have likely been under-utilized. EPA GPR program reports from FY 2009 to FY 2012 reveal that nine states did not fund *any* green infrastructure projects during that period. To address this situation, states could engage in proactive outreach and education to encourage more funding applications for green infrastructure projects.

4. **Commit to using a certain percentage of SRF funds for green infrastructure projects and programs.**

   The Green Project Reserve (GPR) requires each state to direct a portion (currently 10%) of its CWSRF annual capitalization grant toward "green projects."[5] However, the majority of GPR funds are used for CWSRF projects other than green infrastructure,[6] and the GPR is now entirely optional for the DWSRF.[7] States should dedicate a certain percentage of their CWSRF and DWSRF funds exclusively to green infrastructure projects because of the multiple benefits that these techniques provide.

A. Legal authority for states to promote green infrastructure under the SRFs

Existing EPA policy makes clear that green infrastructure projects and programs are eligible for funding under the CWSRF.[8] Moreover, states have the authority to require and/or promote green infrastructure measures as a condition of funding for all CWSRF and DWSRF projects:

CWSRF

- As with the DWSRF, states retain complete discretion to place additional conditions on eligibility for CWSRF funding, so long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.[9] The

Clean Water Act provision governing the CWSRF establishes three broad categories of eligible projects: (1) construction of publicly owned treatment works, (2) implementation of a nonpoint source management program, and (3) development and implementation of an estuary conservation and management plan.[10] The states establish their "criteria and method[s]…for the distribution of funds" through the development of annual Intended Use Plans (IUPs).[11]

DWSRF

- States retain complete discretion to place additional conditions on eligibility for DWSRF funding, so long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.[12] The federal law governing the DWSRF sets forth broad eligibility requirements.[13] States establish their "criteria and methods…for the distribution of funds" through the development of annual Intended Use Plans (IUPs).[14]

B. Examples of State SRF programs that have adopted our recommended approaches

Several states have taken advantage of two of the approaches recommended above in their CWSRF programs: active promotion of SRF funds for green infrastructure projects, and assignment of a higher priority ranking to projects that incorporate elements of green infrastructure.

Actively Promoting Green Infrastructure

- Maryland has actively solicited green infrastructure projects that would help restore the state's tidal and non-tidal water resources as part of its larger Chesapeake Bay restoration efforts.[15] As part of a joint initiative with U.S. EPA and the Chesapeake Bay Trust—the Green Streets, Green Towns, Green Jobs Initiative (G3)—the state provided $3 million in 2013 to support projects that expand green space and reduce stormwater runoff.[16]

- Illinois has a Green Infrastructure Grants program that "seeds" green infrastructure projects by offering an additional funding option for communities seeking financial assistance for green projects, with a particular emphasis on urban stormwater projects and solutions.[17] Approximately $5 million is available annually through this program.[18] However, demand far exceeds the available amount of funding. Over the last four years, an average of $37.5 million of green infrastructure projects

applied for funding each year.[19] Legislation also is pending in Illinois that would expand upon the existing grants program and enable green infrastructure projects to receive support from the CWSRF.

- New York also has a dedicated Green Innovation Grant Program through its CWSRF that "supports projects across New York State that utilize unique stormwater infrastructure design and create cutting-edge green technologies."[20] In 2013, the program provided $10.4 million to 17 green infrastructure projects.[21]

Adjusting Scoring Criteria to Assign a Higher Priority to Green Infrastructure

- Kentucky's priority ranking system for the state's Intended Use Plan provides bonus points of up to 10 points per category for projects that incorporate components from the four green project categories, including green infrastructure.[22]

- Indiana provides up to 1 bonus point per category for projects that incorporate sustainable infrastructure from the GPR categories, including green infrastructure.[23]

- Other states such as Kansas, Maine, and New Hampshire have added additional criteria to their priority ranking systems to ensure that GPR projects scored high enough to be ranked alongside traditional publicly owned treatment works (POTW) projects.[24]

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[1] Climate Central, "Extreme Precipitation Events are on the Rise," *available at* http://www.climatecentral.org/gallery/maps/extreme-precipitation-events-are-on-the-rise.
[2] NOAA, "Heavy downpours more intense, frequent in warmer world," *available at* http://www.climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world.
[3] U.S. Global Change Research Program (USGCRP), "Water Resources," *Global Climate Change Impacts in the United States*, (2009), 49, *available at* http://www.globalchange.gov/images/cir/pdf/water.pdf.
[4] NRDC, "The Multiple Benefits of Green Infrastructure Solutions," *Rooftops to Rivers II* (2011), 13-16, *available at* http://www.nrdc.org/water/pollution/rooftopsii/files/rooftopstoriversII.pdf.
[5] *See* U.S. EPA, "Green Project Reserve," http://www.epa.gov/reg3wapd/infrastructure/gpr.htm.
[6] *See* U.S. EPA, *Clean Water State Revolving Fund Green Project Reserve Funding Status* at Figure 1 (2010), *available at* http://water.epa.gov/aboutow/eparecovery/upload/GPR_Funding_Status_3-17-2010_Final.pdf; U.S. EPA, *Drinking Water State Revolving Fund Green Project Reserve Funding Status* at 1-2 (2010), *available at* http://water.epa.gov/aboutow/eparecovery/upload/GPR_Summary_Report_Revised.pdf.
[7] U.S. EPA, note 5.
[8] U.S. EPA Office of Water, *Green Infrastructure Approaches to Managing Wet Weather with Clean Water State Revolving Funds*, Memo No. 832-F-08-001 (July 2008), *available at* http://www.epa.gov/owm/cwfinance/cwsrf/green_if.pdf.
[9] *See* 33 U.S.C. § 1383 ("Except *as otherwise limited by State law*, a water pollution control revolving fund of a state under this section may be used. . ." (emphasis added)).
[10] 33 U.S.C. § 1383(c).
[11] 33 U.S.C. § 1386.

[12] *See* 42 U.S.C. § 300j-12(f) ("Except *as otherwise limited by state law*, the amounts deposited into a State loan fund under this section may be used…" (emphasis added)).
[13] *See* 42 U.S.C. § 300j-12(a)(2) ("Financial assistance under this section may be used by a public water system only for expenditures (not including monitoring, operation, and maintenance expenditures) of a type or category which the Administrator has determined, through guidance, will facilitate compliance with national primary drinking water regulations applicable to the system … or otherwise significantly further the health protection objectives of this subchapter.").
[14] 42 U.S.C. § 300j-12(b)(2).
[15] U.S. EPA, *ARRA Clean Water State Revolving Fund Green Project Reserve Report* (2012), 12, *available at* http://water.epa.gov/grants_funding/cwsrf/upload/ARRA-CWSRF-GPR-Report.pdf.
[16] Maryland DNR, "Maryland, EPA, Chesapeake Bay Trust Provide $3.4 Million for Green Infrastructure Program," September 4, 2013, *available at* http://news.maryland.gov/dnr/2013/09/04/maryland-epa-chesapeake-bay-trust-provide-3-4-million-for-green-infrastructure-program.
[17] State of Illinois, Water Pollution Control Loan Program Draft Intended Use Plan, Federal Fiscal Year 2013 at 2 (2012), *available at* http://www.epa.state.il.us/water/financial-assistance/waste-water/intended-use/2013-draft.pdf.
[18] Illinois EPA, *Illinois Green Infrastructure Grant Program for Stormwater Management Biannual Report* (2013), 5, *available at* http://www.epa.state.il.us/water/financial-assistance/publications/igig-progress-report.pdf.
[19] Illinois EPA, *Illinois Green Infrastructure Grant (IGIG) Program-Summary & Approved Projects* (2013), *available at* http://www.epa.state.il.us/water/financial-assistance/publications/igig.summary.pdf.
[20] New York State Environmental Facilities Corporation, "Green Grants," *available at* http://www.efc.ny.gov/Default.aspx?tabid=461.
[21] New York State Environmental Facilities Corporation, "Green Innovation Grant Program (GIGP) Grantees for Federal Fiscal Year 2013," *available at* http://www.efc.ny.gov/Default.aspx?tabid=553.
[22] *See* Kentucky Energy and Environment Cabinet & Kentucky Infrastructure Authority, *Final Intended Use Plan for the Clean Water State Revolving Fund for State Fiscal Year 2014* (2013), *available at* http://kia.ky.gov/NR/rdonlyres/516982F3-AD7E-4DE6-B691-80BA115D00C1/0/2014CWSRFIUPfinal.pdf.
[23] *See* Indiana Finance Authority, *Clean Water State Revolving Fund Loan Program Intended Use Plan State Fiscal Year 2013* (2012), *available at* http://www.in.gov/ifa/srf/files/Indiana_2013_CW_Intended_Use_Plan.pdf.
[24] U.S. EPA, *ARRA Clean Water State Revolving Fund Green Project Reserve Report* at 13.

Reducing the Flood Risks of Projects Funded by the SRFs

Floods are the most frequent and the most costly natural disasters in the U.S. Direct average flood damages have increased from almost $6 billion per year in the 1990s to nearly $10 billion per year in the 2000s.[1] Flood risks are only expected to grow due to population growth and climate change. In 2010, there were more than 120 million people living in counties adjacent to the shore, and that population is expected to grow by 10 million by 2020.[2] Millions more live in floodplains near rivers. By the end of the century, the size of the 100-year floodplain is projected to grow by an average of 40 to 45 percent due to climate change, sea level rise, and population growth, increasing the number of federal flood insurance policies by about 80 percent.[3]

Water infrastructure is particularly vulnerable to these increasing risks. Intense rainfall events and coastal storm surges present challenges for water management and flood control infrastructure; increase flooding risks for treatment plants and other facilities; and jeopardize service reliability. Wastewater infrastructure is particularly at risk from flooding due to the low elevation at which these facilities are generally located.[4] Requiring SRF loan recipients to adequately consider existing and future flood risks in the design and construction of projects will help to reduce damages associated with future storms and flood events, and thereby decrease service interruptions, reduce threats to public health and safety, and build climate resiliency.

We recommend five complementary approaches for reducing the flood risks of projects funded by DWSRF and CWSRF programs. As explained in greater detail below, there is ample legal authority for EPA and/or the states to implement these policies, and a number of states are already using these approaches or similar ones.

The five recommended approaches are:

1. **Promote the availability of DWSRF and CWSRF funds for flood risk reduction projects and programs.**

   These types of activities have always been eligible for funding under the SRF programs, but have yet to be widely implemented. While the Green Project Reserve (GPR), which originated with the American Recovery and Reinvestment Act of 2009 (ARRA), requires states to direct a portion of their annual capitalization grants to "green" projects, such as those that help utilities adapt to climate change-related impacts,[5] many of the projects funded under this program have not addressed facilities' flood risks. In addition to making project applicants aware that flood risk reduction activities are eligible for SRF financing, states also can help incentivize projects that incorporate flood risk reduction elements by offering reduced interest

rates, extended repayment terms, or loan forgiveness.[6] States also could incentivize community participation in the Community Rating System (CRS) under the National Flood Insurance Program (NFIP) by allocating priority points to proposed projects from participating CRS communities.[7]

2. **Avoid funding water and wastewater infrastructure projects in the 500-year floodplain to the maximum extent practicable.**

   Presidential Executive Order 11988 and subsequent clarifying guidance from the U.S. Water Resources Council requires federal agencies to seek out alternatives to locating critical facilities, such as water and wastewater infrastructure, in areas subject to inundation from the 0.2 percent annual chance (500-year) flood event.[8] Further, several states have enacted regulations to prohibit the construction of new or substantially-redeveloped critical facilities in the 100-year floodplain.

3. **If it is not practicable to avoid locating a proposed project in the 500-year floodplain, require that water and wastewater projects located within this inundation area protect against the 500-year flood event or the highest historical flood event, whichever is most protective.**

   Elevating structures is one of the most effective means of reducing flood damage to structures in high-risk floodplains.[9] In particular, water and wastewater infrastructure must be protected against floods due to the critical services that these facilities provide and the risks to public health and welfare that can result from damage to these systems. Recognizing the risks that these facilities face from existing and future floods, federal agencies and states are requiring that projects receiving Hurricane Sandy federal disaster recovery funding meet flood protection levels that exceed minimum standards.[10]

4. **Require that projects proposed in coastal floodplain areas consider and protect against sea level rise-related flooding and storm surge risks.**

   In coastal floodplain areas, many critical water-related infrastructure, particularly wastewater facilities, are located adjacent to or directly on the shoreline. Due to their placement in potentially hazardous areas, these facilities may be vulnerable to sea level rise and its subsequent impacts on flooding and storm surge risks. Rising seas will further increase the size of floodplains in many coastal areas of the U.S.[11]

Applicants for projects proposed in coastal floodplains should be required to consider potential flooding and other risks associated with sea level rise during the service life of proposed structures. By doing so, states will help to ensure that projects are being constructed in consideration of both current and future flood risks.

5. **Require that projects use natural and green infrastructure solutions to reduce flood risks to the maximum extent practicable.**

   Natural infrastructure or "soft edge" approaches—such as wetlands, oyster reefs, and dunes along coastlines—and green infrastructure within the built environment can substantially reduce flooding from both storm surges and intense rainfall, thereby offsetting the need for some of the relatively more expensive "hard infrastructure" approaches.[12] Because these measures are valuable climate preparedness techniques due to their flexibility and adaptability, states should require that they be integrated into all SRF projects to the maximum extent possible. Applicants who propose not to integrate these measures should be required to explain why doing so would not be feasible.

A. Legal authority for EPA and states to require that proposed SRF projects reduce flood risks

Existing federal policy requires that EPA avoid actions that have adverse impacts on floodplains and to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.[13] State SRF programs are required to comply with the federal policy on floodplain management because they are capitalized with federal funds.[14]

EPA authority:

- Executive Order 11988 requires federal agencies to avoid actions that have adverse impacts resulting from the occupancy or modification of floodplains and to avoid direct or indirect support of floodplain development by following an eight-step evaluation procedure as part of any environmental assessment prepared under the National Environmental Policy Act (NEPA).[15]
- Subsequent EPA policy on floodplain management affirms that the agency will "[r]educe the hazard and risk of flood loss…" and "minimize the impact of floods on

human safety, health, and welfare, as well as the natural environment" in all actions where the NEPA process applies,[16] including the Title II Construction Grants program.[17]

- Executive Order 11988 applies a basic standard of the 100-year or 1 percent chance annual flood to proposed actions in a floodplain. However, "critical actions" where essential utilities, such as water and wastewater services, would be lost or inoperative if flooded are subject to a higher standard, the 500-year or 0.2 percent chance annual flood.[18]

- Executive Order 11988 and accompanying guidance also recognize "the natural and beneficial values served by floodplains" and seek to minimize harm to and restore and preserve natural floodplain functions.[19]

State authority:

- The federal regulations governing administration of the CWSRF and DWSRF programs stipulate that states must conduct an environmental review process for SRF projects that is consistent with NEPA requirements.[20] EPA's NEPA environmental review procedures require that proposed actions be reviewed to determine if they "significantly affect environmentally important natural resource areas" such as floodplains.[21] Additionally, EPA guidance on environmental review includes floodplain management as one of the environmentally-related cross-cutters that agency actions must comply with.[22]

- Moreover, states retain complete discretion to place additional conditions on eligibility for CWSRF and DWSRF funding, so as long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.[23, 24]

B. Examples of States that have adopted our recommended approaches

Several states have specific policies in place to minimize the flood risks of SRF projects and/or broader state policies that address climate change and flooding-related risks to development. These include (1) prioritizing projects that reduce flood risks; (2) evaluating flood risks during the environmental review process; (3) adopting more stringent floodplain development standards; (4) considering sea level rise and other climate-related risks in project planning; and (5) prioritizing natural and green infrastructure solutions.

Prioritizing projects that reduce flood risks

- At least two states, Missouri[25] and Virginia,[26] provide additional points through the project priority ranking system to public water systems that are proposing upgrades to protect against flood-related damages.

Evaluating flood risks as part of the State Environmental Review Process (SERP)

- Several states reference compliance with Executive Order 11988 in guidance for applicants on completing the environmental review process for SRF projects. Examples include California,[27] Oregon,[28] Georgia,[29] Tennessee,[30] and Vermont.[31]

Adopting more stringent floodplain development standards

- In Colorado, critical facilities are subject to a higher regulatory standard. New and substantially-changed critical facilities and new additions to critical facilities located within the 100-year floodplain are required to either provide flood protection by relocating outside the floodplain or elevating or floodproofing to the base flood elevation plus two feet.[32]

- New York is requiring that recipients of funding under its Storm Mitigation Loan Program, which provides assistance to water and wastewater utilities affected by Hurricane Sandy, to incorporate flood risk reduction elements. Depending on a project's location within the floodplain, project components are required to meet minimum elevation criteria. For example, critical equipment, such as pumps or electrical systems, located in an area subject to sea level rise or tidal action must be elevated at least 5 feet above the 100-year flood level; 4 feet above the Sandy high-water mark; or to the 500-year flood level, whichever is the most protective.[33]

- New Jersey also is requiring applicants seeking project funding from the state's Environmental Infrastructure Finance Program, which disburses the state's SRF program funds, to follow minimum flood elevation requirements. Critical infrastructure projects, such as water and wastewater infrastructure, are to be constructed either outside of the 500-year floodplain when feasible or elevated above the 500-year flood level.[34]

- Additionally, many states' building codes are based off of the International Building Code (IBC), which requires that any building or structure proposed in a flood hazard area adhere to the ASCE 24 Flood Resistant Design and Construction standard.[35]

ASCE 24 requires that the elevation of the lowest floor of Category IV structures, which includes essential facilities like "public utility facilities required in an emergency," to be at least two feet above the base flood elevation or at the community's design flood elevation, whichever is higher.[36] While many state building codes have incorporated ASCE 24 by reference, the enforcement of state building codes is oftentimes left to local jurisdictions,[37] which may lack the capacity or resources necessary to consistently enforce applicable floodplain design standards. Developing specific elevation and/or flood protection requirements for SRF projects would help to reduce the potential flood damage risks associated with inconsistent enforcement of building code standards at the local level.

Considering sea level rise and other climate-related risks

- In California, Executive Order S-13-08 directed all state agencies planning construction projects in areas vulnerable to sea level rise to assess potential project vulnerability and reduce expected risks from sea level rise.[38] To aid in this effort, the California Ocean Protection Council, which helps to coordinate the activities of ocean-related state agencies, has developed guidance for incorporating sea level rise projections into planning and decision-making using recent projections from the National Research Council.[39] Similarly, the California Coastal Commission, which regulates development within the state's coastal zone, has developed draft sea level rise policy guidance for local communities and coastal development permit applicants.[40]

- In Maryland, the Climate Change and "Coast Smart" Construction Executive Order requires that new state structures and substantially damaged state structures being rehabilitated or reconstructed consider the risks of coastal flooding and sea level rise in project design and siting.[41] To support this effort, a subgroup of the Maryland Commission on Climate Change has developed recommendations on how to site and design state structures and structures partially or fully funded by state agencies, such as avoiding locations subject to inundation by sea level rise in the next 50 years.[42]

Prioritizing natural and green infrastructure solutions

- Tidal wetlands regulations in Maryland, as mandated by the Living Shorelines Protection Act of 2008, require that shore erosion control projects use nonstructural stabilization measures, such as tidal wetland vegetation or a living

shoreline, "to preserve the natural shoreline, minimize erosion, and establish aquatic habitat."[43]

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[1] The Association of State Floodplain Managers, *Flood Mapping for the Nation: A Cost Analysis for the Nation's Flood Map Inventory* (2013), 3, *available at* http://www.floods.org/ace-files/documentlibrary/2012_NFIP_Reform/Flood_Mapping_for_the_Nation_ASFPM_Report_3-1-2013.pdf.

[2] NOAA's State of the Coast, *National Coastal Population Report: Population Trends from 1970 to 2020* (2013), 4, *available at* http://stateofthecoast.noaa.gov/coastal-population-report.pdf.

[3] AECOM, Michael Baker Jr., Inc., and Deloitte Consulting, LLP, *The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100* (2013), ES-7, *available at* http://www.aecom.com/deployedfiles/Internet/News/Sustainability/FEMA%20Climate%20Change%20Report/Climate_Change_Report_AECOM_2013-06-11.pdf.

[4] U.S. EPA-Climate Ready Water Utilities, "Climate Challenge Group: FLOODS (DW/WW)," *Adaptation Strategies Guide for Water Utilities* (2012), 67, *available at* http://water.epa.gov/infrastructure/watersecurity/climate/upload/epa817k11003.pdf.

[5] U.S. EPA, "Attachment 7. CWSRF Project Descriptions and Examples for Green Project Reserve," and "Attachment 8. DWSRF Project Descriptions and Examples for Green Project Reserve," *American Recovery and Reinvestment Act Guidance* (2009), *available at* http://water.epa.gov/aboutow/eparecovery/upload/2009_03_31_eparecovery_STIMULUS_Guidance_Green_Reserve-2.pdf.

[6] State SRF programs commonly promote certain practices through the use of financial incentives, such as reduced and zero interest rates, extended term financing of up to 30 years, and additional loan subsidization through principal forgiveness, grants, or negative interest loans. *See e.g.,* U.S. EPA, *Sustainability and the Clean Water State Revolving Fund: A Best Practices Guide* (2012), 13-14, *available at* http://water.epa.gov/grants_funding/cwsrf/upload/CWSRF-Best-Practices-Guide.pdf.

[7] The CRS is a voluntary program, which provides reduced flood insurance premiums for communities that have adopted better floodplain management practices. Communities receive points for various floodplain management activities, which in turn, places communities into one of ten classes with a corresponding 0 to 45 percent reduction in flood insurance premiums. *See* Federal Emergency Management Agency (FEMA), "National Flood Insurance Program Community Rating System," *available at* http://www.fema.gov/national-flood-insurance-program-community-rating-system.

[8] *See* Exec. Order No. 11988, 42 Fed. Reg. 26951 (May 24, 1977) and U.S. Water Resources Council (WRC), *Floodplain Management Guidelines*, 43 Fed. Reg. 6030 (February 10, 1978).

[9] Association of State Floodplain Managers, *A Guide for Higher Standards in Floodplain Management* (2013), 3-5, *available at* http://www.floods.org/ace-files/documentlibrary/committees/3-13_Higher_Standards_in_Floodplain_Management2.pdf.

[10] Because of the pervasiveness of the National Flood Insurance Program (NFIP), its requirement that the first floor of any structure be located at or above the base flood elevation (*i.e.,* 100-year flood level) is considered the minimum national standard.

[11] A report prepared for FEMA projects that the size of the coastal special flood hazard area (*i.e.,* 100-year floodplain) typically increases 55 percent by the year 2100 as a result of sea level rise, coastal storms, and population growth. Similarly, the total number of coastal NFIP policies is projected to increase as much as 130 percent. *See* AECOM, Michael Baker, Jr., Inc., and Deloitte Consulting, LLP, *The Impact of Climate Change and Population Growth on the National Flood Insurance Program* (2013), ES-7-ES-8, *available at* http://www.aecom.com/deployedfiles/Internet/News/Sustainability/FEMA%20Climate%20Change%20Report/Climate_Change_Report_AECOM_2013-06-11.pdf.

[12] Techniques such as the restoration of coastal wetlands and oyster reefs utilize natural features to mitigate storm surge, flooding, and erosion risks. These natural features serve to absorb storm surge and flood waters and dissipate wave energy, providing protection from coastal storms and flooding. They also provide wildlife habitat, enhance fisheries, maintain natural shoreline dynamics, filter water pollutants, and preserve public access to the shoreline. Green infrastructure techniques can be utilized to reduce flooding risks associated with more frequent

and intense rainfall events. These techniques use soils and vegetation in the built environment to absorb runoff close to where it falls, limiting flooding and sewer backups. *See* e.g., The Center for Clean Air Policy, *The Value of Green Infrastructure for Urban Climate Adaptation* (2011), ii-iii, *available at* http://ccap.org/assets/THE-VALUE-OF-GREEN-INFRASTRUCTURE-FOR-URBAN-CLIMATE-ADAPTATION_CCAP-February-2011.pdf; NOAA Office of Ocean and Coastal Resource Management, "Alternative Shoreline Stabilization Methods," revised October 2, 2012, *available at* http://coastalmanagement.noaa.gov/initiatives/shoreline_stabilization.html; NRDC, *Rooftops to Rivers II: Green Strategies for Controlling Stormwater and Combined Sewer Overflows* (2011), *available at* http://www.nrdc.org/water/pollution/rooftopsii/; and Mark D. Spalding, Susan Ruffo, Carmen Lacambra, Imèn Meliane, Lynne Zeitlin Hale, Christine C. Shepard, and Michael W. Beck, "The role of ecosystems in coastal protection: Adapting to climate change and coastal hazard," *Ocean & Coastal Management* (15 Oct 2013), *available at* http://dx.doi.org/10.1016/j.ocecoaman.2013.09.007.

[13] Direct support includes actions located in a floodplain, and indirect support includes actions located outside a floodplain, such as construction of water and wastewater systems, that foster additional development in a floodplain. *See* U.S. Water Resources Council, note 8.

[14] *See* Interagency Task Force on Floodplain Management, *Further Advice on Executive Order 11988 Floodplain Management*, *available at* http://www.gsa.gov/graphics/pbs/Advice_EO11988.pdf ("Federal actions include actions by applicants that are financed with Federal funds or that are otherwise assisted, regulated, or approved by the Federal government. This would include federally undertaken, financed, or assisted construction and improvements…")

[15] Exec. Order No. 11988, note 8. 42 Fed. Reg. 190 (September 39, 1977) describes the eight step process that agencies are to follow to evaluate a proposed action's flood risk and impacts as part of any environmental assessment prepared under NEPA: (1) Determine if a proposed action is in the base flood plain; (2) Early public review; (3) Identify and evaluate practicable alternatives to locating in the base floodplain; (4) Identify impacts of the proposed action; (5) Minimize, restore, preserve; (6)Reevaluate alternatives; (7) Findings and public explanation; and (8) Implement action.

[16] U.S. EPA, *Statement of Procedures on Floodplain Management and Wetlands Protection* (1979), *available at* http://www.epa.gov/compliance/resources/policies/nepa/floodplain-management-wetlands-statement-pg.pdf.

[17] The Title II Construction Grants program, authorized under Section 201 of the Clean Water Act, preceded the CWSRF.

[18] *See* Interagency Task Force on Floodplain Management, note 14.

[19] Exec. Order No. 11988 and U.S. WRC, note 4 ["Floodplains in their natural or relatively undisturbed state serve water resources values (natural moderation of floods, water quality maintenance, and groundwater recharge), living resource values (fish, wildlife, and plant resources)…]. Maximizing the use of natural and green infrastructure solutions , which restores the hydrology and/or other natural processes at a site, would serve to restore and preserve natural floodplain functions in accordance with the Executive Order.

[20] *See* 40 CFR §35.3140 and 40 CFR §35.3580.

[21] 40 CFR §6.204(b)(5).

[22] Cross-cutters are federal statutes, executive orders, or implementing regulations that agencies must consider when taking action. *See* U.S. EPA, *Environmental Review Guide for Special Appropriation Grants* (2008), 159-161, *available at* http://www.epa.gov/compliance/resources/policies/nepa/environmental-review-guide-grants-pg.pdf.

[23] The Clean Water Act provision governing the CWSRF establishes three broad categories of eligible projects: (1) construction of publicly owned treatment works, (2) implementation of a nonpoint source management program, and (3) development and implementation of an estuary conservation and management plan. The states establish their "criteria and method[s]…for the distribution of funds" through the development of annual Intended Use Plans (IUPs). 33 U.S.C. § 1383.

[24] The federal law governing the DWSRF sets forth broad eligibility requirements, stating: "Financial assistance under this section may be used by a public water system only for expenditures (not including monitoring, operation, and maintenance expenditures) of a type or category which the Administrator has determined, through guidance, will facilitate compliance with national primary drinking water regulations applicable to the system … or otherwise significantly further the health protection objectives of this subchapter." The states establish their

"criteria and methods…for the distribution of funds" through the development of annual Intended Use Plans (IUPs). 42 U.S.C. § 300j-12(b)(2).

[25] *See* Missouri Department of Natural Resources, *Missouri Drinking Water State Revolving Fund Priority Points Criteria* (2013), *available at* http://www.dnr.mo.gov/pubs/pub2362.pdf.

[26] *See* Virginia Department of Health, *Drinking Water State Revolving Fund Program Design Manual* (2014), 15, *available at* http://www.vdh.virginia.gov/odw/financial/documents/2015Funding/03-SRF%20Program%20Design%20Manual.pdf.

[27] *See* State of California Water Resources Control Board, *Clean Water State Revolving Fund – Instructions and Guidance for* '*Environmental Compliance Information*' (2013), *available at* http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/envcompliance/federal_cross_cutting_evaluation_form.pdf.

[28] *See* Oregon Clean Water State Revolving Fund, *Applicant Guide to the State Environmental Review Process (SERP)* (2012), *available at* http://www.deq.state.or.us/wq/loans/docs/SERPApplicantGuide.pdf.

[29] *See* Georgia Department of Natural Resources, *Georgia's Drinking Water State Revolving Fund State Environmental Review Process* (2004), *available at* http://www.gaepd.org/Files_PDF/techguide/wpb/dwsrf_guide.pdf.

[30] *See* Tennessee Department of Environment and Conservation, "Facilities Plan Environmental Information Requirements," *available at* http://www.tn.gov/environment/water/fund_planning-facilities-environmental-requirements.shtml.

[31] *See* Vermont Department of Environmental Conservation, *DWSRF Guidance Document Number 15 – Environmental Review* (2012), *available at* http://drinkingwater.vt.gov/dwsrfgd/pdf/guidancedoc15.pdf.

[32] 2 Code Colo. Regs. § 408-1. Although Rule 6 specifically excludes wastewater treatment plants from classification as "critical facilities," owners of these facilities are encouraged to follow the rule when practicable.

[33] New York State Environmental Facilities Corporation, *Storm Mitigation Loan Program Fact Sheet* (2013), *available at* http://www.efc.ny.gov/DesktopModules/DNNCorp/DocumentLibrary/Components/FileDownloader/FileDownloaderPage.aspx?tabid=76&did=4093&pid=0&lrf=/DesktopModules/DNNCorp/DocumentLibrary/App_LocalResources/DocumentLibrary&cl=en-US&mcs=%2fDesktopModules%2fDNNCorp%2fDocumentLibrary%2f&uarn=Administrators&cd=false&tmid=258&ift=1.

[34] New Jersey Department of Environmental Protection, *Infrastructure Flood Protection Guidance and Best Practices* (2014), *available at* http://www.nj.gov/dep/watersupply/pdf/guidance-ifp.pdf.

[35] International Building Code § 1612.4 (2012 ed.)

[36] American Society of Civil Engineers (ASCE), Standard 24-05, Flood Resistant Design and Construction.

[37] Association of State Floodplain Managers (ASFPM), "Appendix," *Floodplain Management 2010: State and Local Programs* (2011), 147-148, *available at* http://www.floods.org/index.asp?menuid=732&firstlevelmenuid=186&siteid=1#appendix.

[38] Office of the Governor, State of California, Exec. Order No. S-13-08.

[39] *See* The Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), *State of California Sea-Level Rise Guidance Document* (2013), *available at* http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf.

[40] *See* California Coastal Commission, *Draft Sea-Level Rise Policy Guidance* (2013), *available at* http://www.coastal.ca.gov/climate/slr/guidance/CCC_Draft_SLR_Guidance_PR_10142013.pdf.

[41] Executive Department, State of Maryland, Exec. Order 01.01.2012.29.

[42] Adaptation Response Working Group of the Maryland Commission on Climate Change, *State of Maryland Climate Change and Coast Smart Construction: Infrastructure Siting and Design Guidelines* (2014), *available at* http://climatechange.maryland.gov/site/assets/files/1582/climate_change_and_coast_smart_final_report.pdf.

[43] Md. Code. Ann Env. § 26-24-01.